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## PROVISIONAL SPECIFICATION

Invention Title: **Packaging of elongate articles**

The invention is described in the following statement:

## **Packaging of elongate articles**

### **Field of the Invention**

This invention relates to the packaging of smoking articles, typically cigarettes, in sealed blister-pack type packages, the invention is more particularly concerned with scaling an array of smoking articles within a single blister-pack compartment.

### **Background of the Invention**

Blister tray type packaging is known for many articles, including medical products, foodstuff and the like. However, such packaging is not used in some industries because of difficulty in packaging particular articles, or because the articles are not considered suitable for this type of packaging.

Cigarettes are typically sold in packs of twenty or thirty cigarettes, typically within a crush-proof hinge-lid pack, or a crushable soft pack.

A light smoker or a smoker who is trying to give up smoking might not wish to purchase a full pack of cigarettes. However, cigarettes are not typically sold in small numbers, other than in informal sale arrangements. Opening of packets and supplying cigarettes in small numbers is both unhygienic and can lead to the supply of inferior product.

Also, traditional cigarette products tend to be expensive to manufacture. This is because the machinery to assemble the packages and insert the cigarettes into each package is extremely complex and costly. Such machines are also costly to maintain and require skilled operating staff to supervise manufacture. Since these costs are borne ultimately by consumers of the cigarettes, the complexity of the packaging process adds significantly to the cost of cigarettes to the consumer.

### **Summary of the Invention**

According to a first aspect of the invention there is provided a blister pack comprising a first blister tray formed with a plurality of trough formations in parallel, side-by-side relationship, each trough formation being shaped to accommodate an array of two to ten smoking articles, with adjacent trough formations being spaced apart from

one another by planar lands to which a peelable or rupturable backing film is laminated so as to define a plurality of individually sealed compartments, with each array of smoking articles being individually accessible by rupturing or peeling away that portion of the backing film covering the array.

- 5            Preferably, trough-receiving recesses are defined between adjacent trough formations, the trough-receiving recesses being sized to receive second trough formations of a second overlying blister tray in a snug complementary fit.

In one form of the invention, the second blister tray forms part of a second separate blister pack.

- 10           Alternatively, the first blister tray is hinged to the second blister tray.

Lines of weakness may extend through adjacent planar lands and/or the backing film for allowing the selective severing or opening of individual sealed compartments.

Typically, the backing film is provided with film access means.

- 15           The film access means may comprise a non-attached corner lug for allowing the film to be manually gripped prior to peeling.

Alternatively, the film access means may comprise a blister tray having a peeling recess spaced away from the planar level and defining an airgap for allowing the film to be manually gripped prior to peeling.

- 20           The backing film may be laminated to the tray by means of a resealable adhesive adapted to allow access to be obtained to the smoking articles within the trough formation by peeling the backing film away from the tray, and resealing the backing film to the tray.

- 25           Preferably, each of the elongate trough formations terminate in minor planar end walls which are spaced apart from one another by a distance corresponding to the lengths of the smoking articles, so that the inner surfaces of the end walls serve to retain tobacco particles within the smoking articles.

The invention extends to a blister pack comprising a first blister tray defining a first trough and a first trough-receiving recess adjacent the first trough, a second blister

tray hinged to the first blister tray along a fold line and defining a second trough directly opposite the first recess and a second trough-receiving recess directly opposite the first trough.

5 Conveniently, the blister pack is foldable between an open position and a closed position in which the first trough locates complementally within the second recess and the second trough locates complementally within the first recess.

Typically, the first blister tray defines a row of first troughs alternating with a row of first recesses, and the second blister tray defines a row of second troughs alternating with a row of second recesses, the rows of first and second troughs being arranged to interdigitate with one another when folded together. Preferably the troughs and recesses are substantially mirror images of each other such that when the first and second troughs are interdigitated with each other, a minimum of space exists between the first and second blister trays.

15 Conveniently, the first and second blister trays have planar substrates or lands and a peelable or rupturable backing film laminated to the planar substrates.

The troughs are preferably elongate troughs extending in a direction perpendicular to the fold line, the troughs being sized to accommodate an array of smoking articles.

Advantageously, a pair of parallel fold lines are provided, with the fold lines being spaced apart from one another by a distance corresponding to the depths of the compartments, such that the planar substrates are in opposed parallel relationship when the blister trays are folded together.

25 Preferably each of the trough formations are shaped so as to have a fluted configuration such that the inner surface of each trough defines a plurality of parallel elongate concave recesses adapted to receive and support said array of smoking articles in the trough formation in a closely stacked configuration.

Preferably the radius of curvature of each elongate concave recess is half the diameter of the smoking articles to be located in the trough formation.

Each trough formation may be of generally triangular, truncated triangular, trapezoidal or rectangular configuration so as to accommodate said array of smoking articles in a space efficient configuration.

5 The invention extends to a smoking article pack comprising a blister pack according to any one of claims 1 to 16, with two to ten smoking articles such as a cigar or cigarette being accommodated in each trough.

10 The invention extends to a smoking article package comprising a self supporting tray formed of a thermo-plastic material defining an elongate trough formation containing an array of between two and ten smoking articles, said trough formation being contiguous with and surrounded by a planar land, and a peelable or rupturable backing film laminated to said planar land so as to encapsulate said array of smoking articles in said trough formation, said array of smoking articles being accessible by rupturing or peeling away the backing film from the tray.

15 The smoking articles are typically in a nested configuration within each trough formation and, in the case of a multi-layer array, the articles preferably progressively decrease by one from a base layer upwards.

The backing film may be laminated to the lands by any bonding method, such as gluing or heat sealing, as well as by a co-extrusion process.

#### **Brief description of the drawings**

20 Figure 1 shows a top plan view of a first embodiment of a blister pack of the invention;

Figure 2 shows a cross-section of the line 2-2 of Figure 1;

Figures 3 and 3A show perspective views of details of variations of film access means forming part of the blister pack of the invention;

25 Figure 4 shows a perspective view of a single package holding three cigarettes with the backing film removed from the tray.

Figure 5 shows an opened out plan view of a second embodiment of a blister pack of the invention;

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Figure 6 shows a side view of the blister pack of Figure 5 in the partly open position;

Figure 7 shows a perspective view of the blister pack of Figure 5 in a closed position;

5 Figure 8 shows a cross-section on the line 8-8 of Figure 7; and

Figures 9 to 13 show detailed cross-sectional views of different embodiments of the invention.

#### Detailed description of the embodiments

Referring first to figures 1 and 2, a blister pack 10 comprises a transparent blister tray 12 which is vacuum formed from a sheet of clear PVC having a thickness of between about 180 and 250 microns. The blister tray 12 defines a plurality of trough formations 14.1 to 14.5 which are dimensioned to accommodate an array of three conventional cigarettes 16 each having a length of 85 mm and a diameter of 8 mm, with opposed ends of the cigarette abutting opposed planar end faces 18 and 20 of each trough formation so as to prevent particles of tobacco from being dislodged from the tip of each cigarette. Extending between each trough formation 14.1 to 14.5 are planar land zones 22. The planar land zones 22 extend between adjacent troughs, as well as beyond the opposed end faces 18 and 20 of the trough. Each trough formation 14 comprises radiused portions 15a, 15b, 15c, which have a radius of curvature of about 4 mm, corresponding to the cigarette radii to provide a snug complementary fit. A peelable backing film 24 is co-extruded with the planar land end, in conjunction with the trough formations 14.1 to 14.10, defines a plurality of sealed compartments 26, providing an air-and water-tight housings for the cigarettes 16. The backing film or web is typically formed from a coated polyethylene having thickness of approximately 60 microns. The film is a multi-layer very high moisture barrier film which is peelable across the full seal range. It is manufactured by LMG Smith Brothers under film designation Y 577/2, and has the following data sheet:

#### Film Designation Y 577/2

#### Description

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A blown, co-extrudable, polyethylene multi-layer very high moisture barrier film which is peelable across the full seal range, and which provides a peelable seal to a PVC base.

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**Sealing Details:**

Seal type: constant heat

Sealing range: 80° - 100°C

**Physical appearance:**

Appearance: Matt

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Colour: full white

Opacity 60 = 5%

**Gauge Range:**

Film is available in the range of 37- 100 microns.

**Technical Data:**

	<b>Tolerance:</b>	<b>Method:</b>	<b>Nominal</b>
Gauge	$\pm 12\%$	Micrometer	60 Microns
Yield	$\pm 5\%$	Analytical	17.6M <sup>2</sup> /Kg
O <sub>2</sub> Permeability		Oxtrans	>1500ccM <sup>2</sup> /Day
WVTR		EPS Dynamic WVTR(38°C and 90% RH)	<3.5gms/M <sup>2</sup> /Day

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A series of parallel perforations 28 are formed through both the planar land zones 22 of the blister tray and the film 24. The perforations 28 are exactly midway between and parallel to the adjacent troughs, and are perpendicular to the side edges 30 and 32 of



the blister pack. This allows one or more blister pack strips to be selectively torn from the remaining strips.

In order to enable the film 24 to be peeled off more easily from the undersurface of the planar land, a corner-piece 36 of the film is not attached, so as to provide a lifting tab for peeling off the film. Each strip is provided with a similar non-attached lifting tab 36.

Referring now to Figure 3A, an underside perspective detail of an alternative embodiment is shown in which the planar land 24 is formed with a recessed rib 38 adjacent the edge of the blister pack and defining a space 40 providing access to the film for allowing it to be peeled away from the blister tray. As the perforations 28 extend both through the blister tray and through the film, instead of tearing off a strip 34, it is possible to leave the strip in place and gain access to one of the cigarettes 16 merely by tearing off a strip 42 of the film. As a further alternative, each of the planar land zones surrounding each trough may be formed with a frangible corner piece 43 which can be broken away to enable the overlying corner piece of the film 36 to be gripped.

In figure 4, a standalone blister tray defines a single trough formation 14.1, housing an array of three cigarettes in a snug complementary fit.

Referring now to Figure 5 to 7, a still further preferred embodiment 44 of a blister pack is shown comprising first and second blister trays 46 and 48 which are hinged to one another on spaced parallel and perforated hinge lines 50 and 52 defining between them an end wall 54. Marginal perforated lines 56 and 58 parallel to the perforated lines 50 and 52 and are formed towards the free ends of the blister pack, which terminate in sealing flaps 60 and 62. The planar web of the first blister tray 46 is cut short at 64, thereby exposing the film 60, which may have a tacky surface. The blister pack 44 is foldable between an open position indicated in Figure 5 to a closed position indicated in Figure 7, in which it forms a complete closed pack with the tacky surface of the sealing flap adhering to the sealing flap 62 so as to define a closed pack.

The first blister tray is formed with five troughs 66.1 to 66.5, which alternate and are spaced apart by first rough-receiving recesses 68.1 to 68.5. The second blister tray 48

is similarly formed with five troughs 70.1 to 70.5 which are often offset relative to the troughs 66.1 to 66.5 and which alternate with second trough-receiving recesses 72.1 to 72.5. It is clear from the drawing how the first troughs 66.1 to 66.5 are directly opposite and are symmetrical with the respective second trough-receiving recesses 72.1 to 72.5 about an axis of symmetry 74. Similarly, the second troughs 70.1 to 70.5 are symmetrical with the corresponding first trough-receiving recesses 68.1 to 68.5. As a result of this structure, and as is clear from Figure 8, the first row of troughs 66.1 to 66.5 nest snugly within the second row of trough-receiving recesses 72.1 to 72.5 and the second row of troughs 70.1 to 70.5 form a snug complementary fit within the row of recesses 68.1 to 68.5, with the first and second rows of troughs being interdigitated.

The resultant structure of the closed blister pack 44 is relatively compact and rigid. Further, it provides a number of different options for accessing cigarettes. As a first option, the overall integrity of the blister pack 44 may be retained, and laminated strips of film 76 may be selectively removed so as to gain access to the cigarettes within the trough. As a second option, the entire pack may be opened and disassembled either by separating the marginal flaps from one another, by tearing the pack along the perforated lines 56 and 58, or along the perforated hinge lines 50 and 52. If the pack is torn along both the marginal perforated lines 56 and 58 and the perforated hinge lines 50 and 52, then the two blister trays 46 and 48 are completely separated into separate rows, as per the Figure 1 embodiment. Cigarettes can then be distributed either singly or in groups by selectively tearing along the perforated lines 28. The blister pack 44 may be enclosed by means of a sleeve having the form of an open-ended rectangular cylinder.

In a further embodiment of the invention, two blister trays 10 may be stacked on top of one another with the trough formations of the overlying blister tray nesting within the trough-receiving recesses defined between the adjacent trough formations 14.1 to 14.6 as is shown in Figure 8. The two overlying blister packs may then be packaged in an overwrap film or a box or a sleeve.

In a still further embodiment, a hinged blister pack 44 of the type illustrated in Figure 5 may be provided with a single hinge line corresponding to the axis of symmetry 74, as a result of which the first and second blister trays 46 and 48 can be folded back-to-

back with their planar undersurfaces in direct contact with one another. For the purposes of double-layer compact packaging, blister packs 10 of the type illustrated in Figure 1 may then be laid over the exposed troughed surfaces so as to achieve a double layer.

5 In place of a peelable film, a rupturable film may also be used as a backing film. This may be in the form of a 12 to 30 micron hard aluminium foil film of the type manufactured by Alusuisse. The film is lacquer coated on its operatively inner side to enable it to be laminated to the lands of the blister tray. The opposite exposed face of the metallic film or foil is able to receive printing for advertising purposes. A rupturable film of this type is sufficiently strong and flexible to ensure that the cigarettes are maintained within the blister pack, while at the same time being able to rupture relatively easily by pressure of the cigarette caused by finger pressure on the opposite side of the deformable trough, without deforming the cigarette unduly. The blister pack of the invention is ideally suited to an economical and high speed and typically continuous manufacturing process.

10 15 Turning now to figures 9 to 13 of the drawings, the manner in which different configurations of packages are interleaved together is shown in more detail. It will be noted that the trough receiving recesses 80, 82, 84, 86, 88 and 90 in each case are shaped so as to receive the respective troughs 92, 94, 96, 98 and 100 of the underlying pack therein, and visa versa. The result is that when the troughs of the overlying pack are pressed fully into the trough receiving recesses in the tray below a snug fit between the two layers is achieved thereby ensuring that there is a minimum of waste of space in the finished pack. It is important that wasted space is minimised for bulk packaging of smoking articles since any wasted space will decrease the bulk density of the packaged articles leading to an increase in transport and storage costs.

20 25 Figures 9 to 13 show a series of different configurations of arrays, but it will be understood that other arrangements are also possible. It is considered important that the trays are relatively robust to allow for the shearing of the individual packages from the tray, so the preferred configurations are an optimisation of space efficiency, manufacturing simplicity, packaging simplicity, and structural integrity.

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Figure 9 depicts the manner in which six unit packages will be interleaved, figure 10 depicts the manner in which 5 unit packages will be interleaved, figure 11 depicts the manner in which 2 unit packages will be interleaved, figure 12 depicts an alternative manner in which 3 unit packages will be interleaved, and figure 13 depicts the manner in which 10 unit packages will be interleaved.

Clearly certain of the arrangements shown in figures 8 to 13 have a greater efficiency in bulk density and/or efficient use of packaging materials than other arrangements. Some arrangements are preferable from a manufacturing and/or cigarette handling point of view. It is envisaged that the package of three articles and six articles will be most efficient in terms of use of materials and space, but the other configuration will operate in practice.

It is preferred that the internal surface of the trough formations are contoured to receive the smoking articles. As will be clear from the drawings, each of the trough formations is of a generally fluted configuration defining a series of concave shaped elongate recesses 102 which support the smoking articles along their full length and assist in holding the smoking articles in their optimal array configurations. The concave recesses 102 will have radius of curvature which is half the diameter of the smoking articles to be located therein. For conventional cigarettes, having a diameter of 8mm, the radius of curvature of the recesses will thus be approximately 4mm. The internal contour configuration of the trough formation will ensure that when the smoking articles are located in the trough formations during packaging the smoking articles will align naturally in the most space efficient configuration within the trough formation. The fluted configuration of the troughs will also serve to rigidify the troughs ensuring that the smoking articles are protected against damage during transportation.

It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

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The foregoing describes embodiments of the present invention and modifications, obvious to those skilled in the art can be made thereto, without departing from the scope of the present invention.

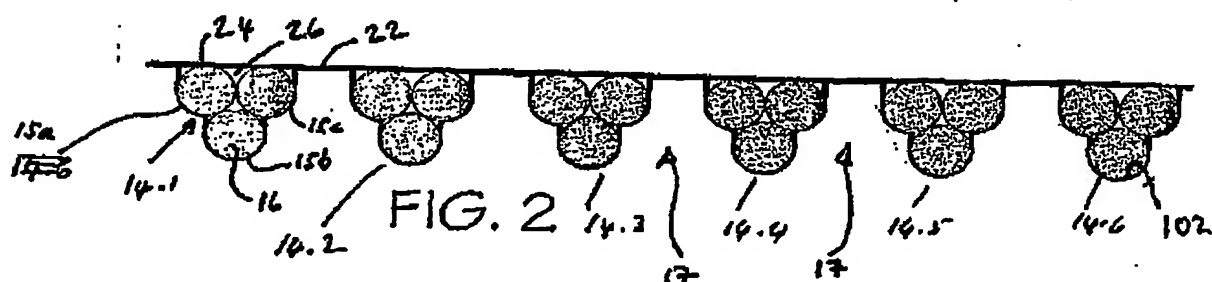
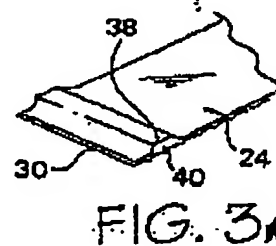
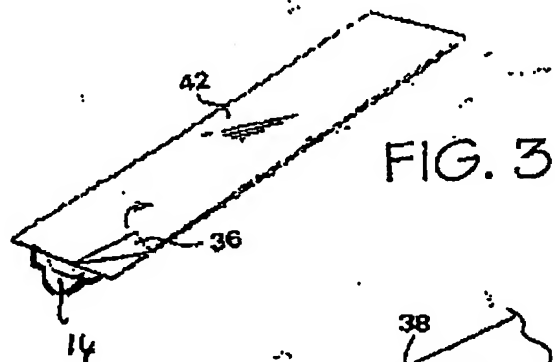
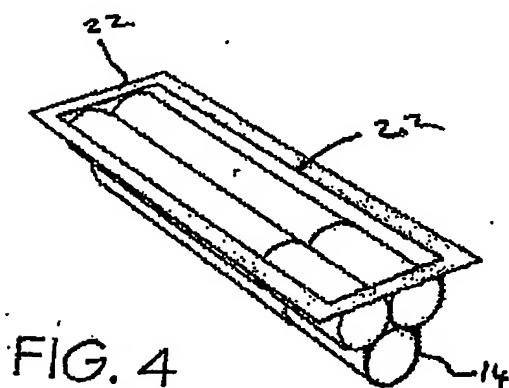
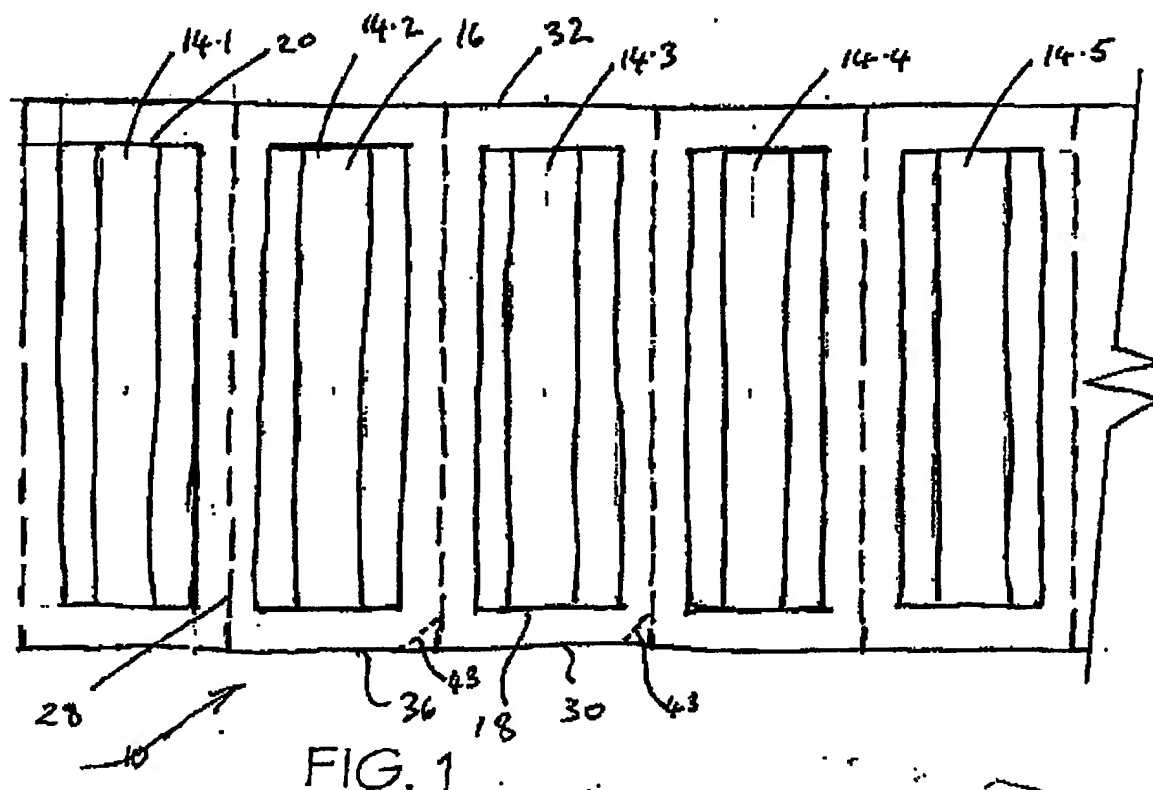
Dated this 11<sup>th</sup> day of August, 2003

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Neol Fenshaw  
by its attorneys  
Freehills Carter Smith Bendle

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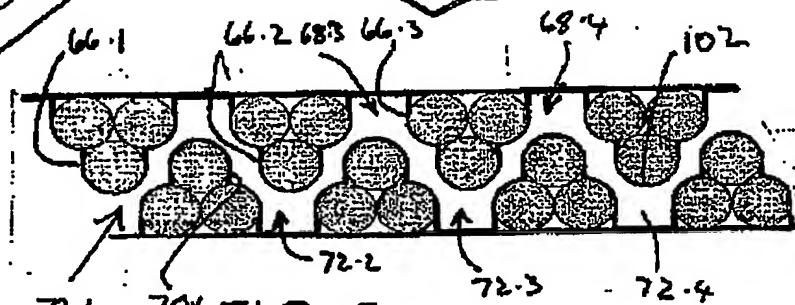
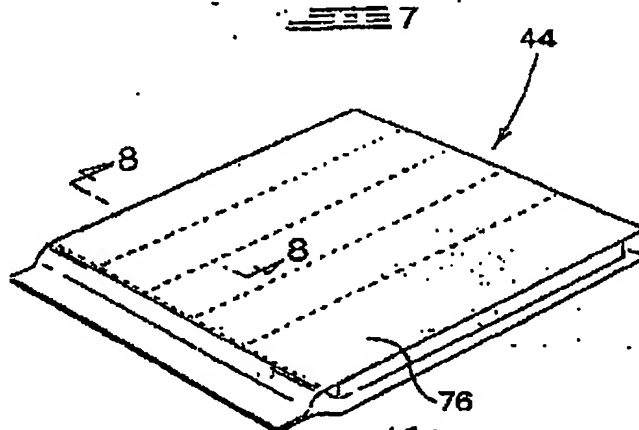
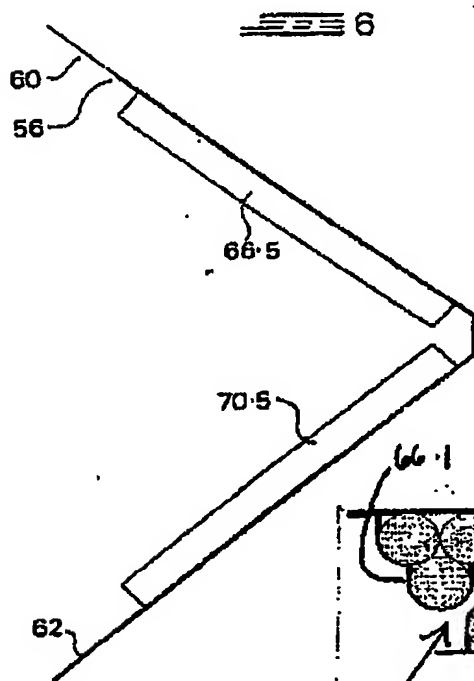
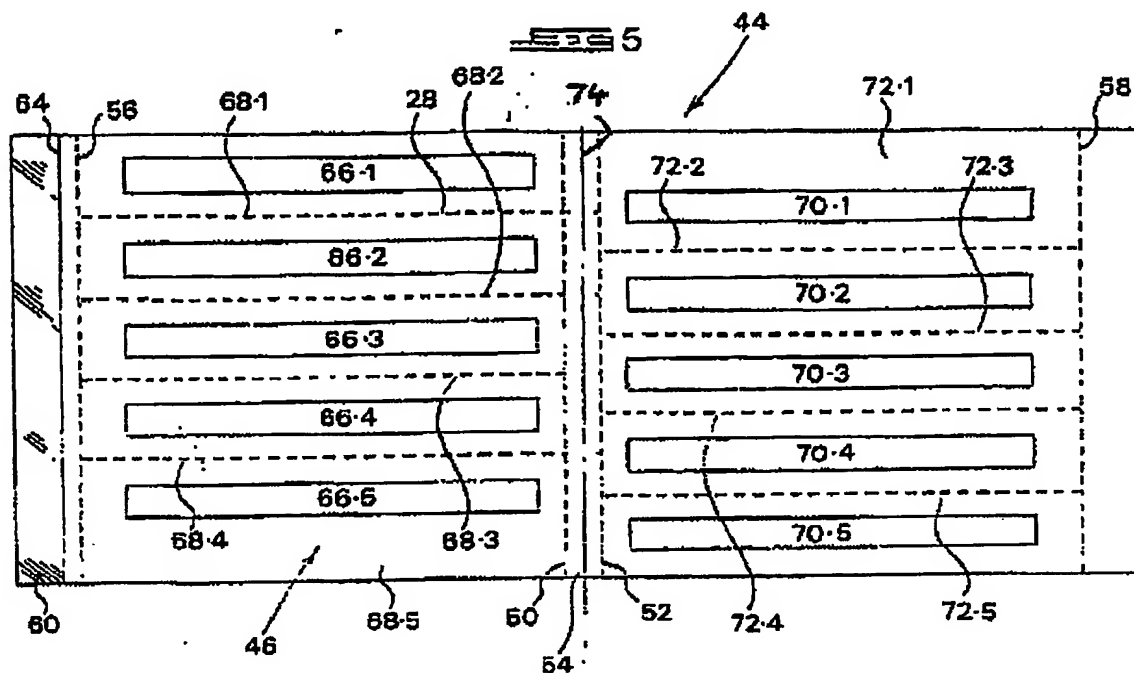


FIG. 8

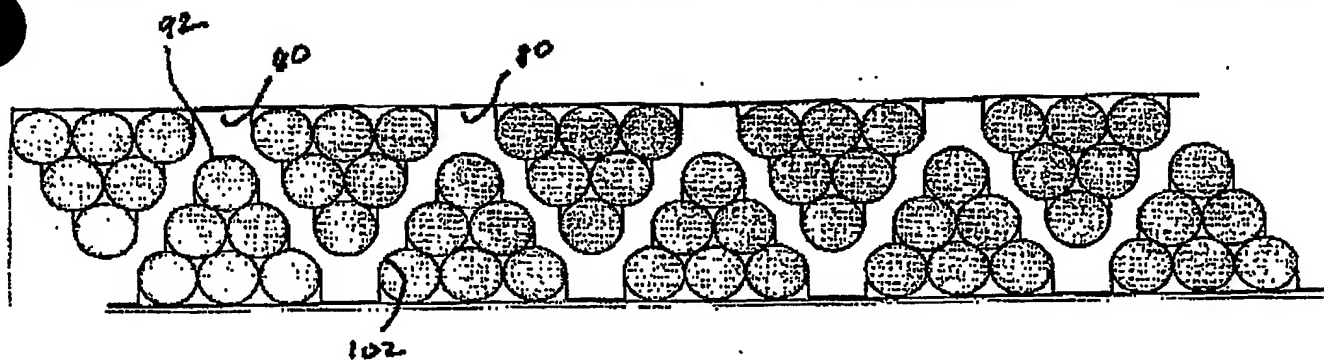


FIG. 9

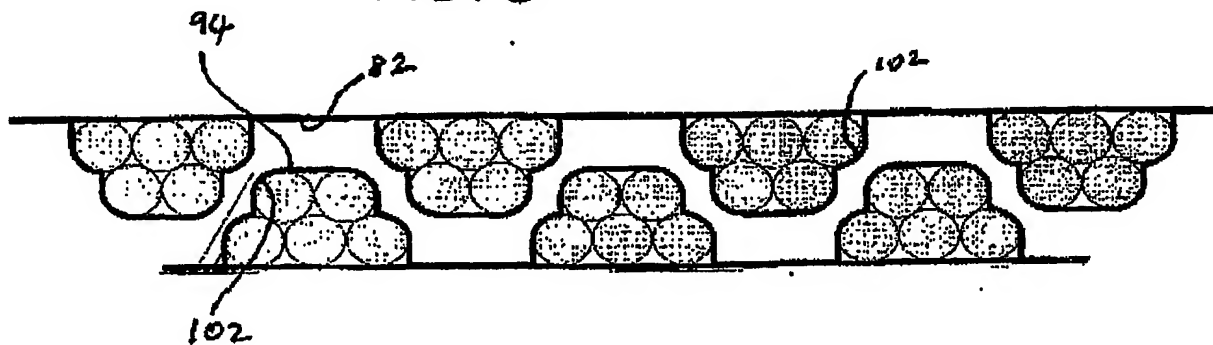


FIG. 10

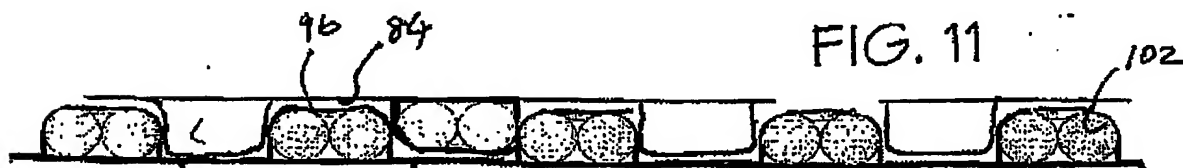


FIG. 11

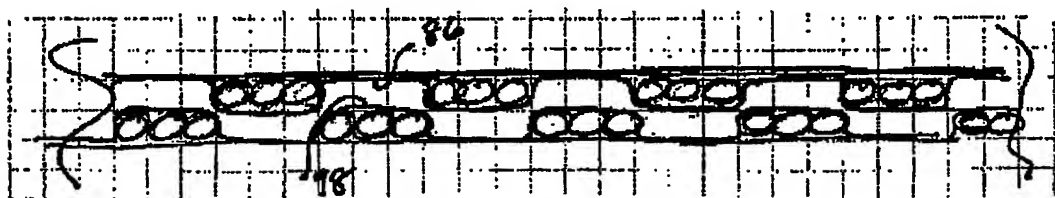


FIG. 12

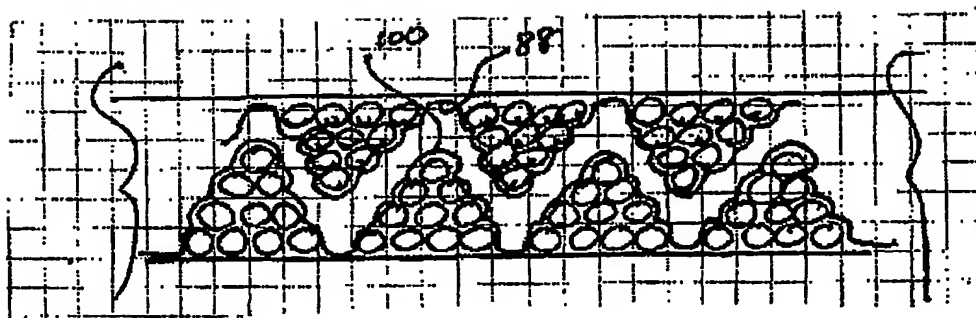


FIG. 13



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